PGS Newsletter

http://www.pittsburghgeologicalsociety.org/

Vol. LXV, No. 1 | Robert Botterman, Editor | September, 2012

Wednesday, September 19, 2012

The Pittsburgh Geological Society presents

Disparate Paths in the Geologic Evolution of the Northern and Southern Appalachians: A Case for Inherited Contrasting Lithospheric Substrates

Dr. James Hibbard, Professor, Dept. of Marine, Earth, and Atmospheric Sciences
North Carolina State University, Raleigh, North Carolina

Modern understanding of the tectonic evolution of the Appalachians allows for recognition of most of the first-order lithotectonic elements and events of the orogen. Comparison of these features and events along the length of the orogen indicates that the northern and southern segments of the Appalachians display distinct first-order differences.

Contrasts between these segments of the orogen existed from the outset of the Appalachian cycle. Mesoproterozoic basement rock types south of Pennsylvania are different than those to the north and basement rocks in each area display distinct Nd and Pb isotopic signatures. A subsequent phase of c. 770-680 Ma, Cryogenian rifting is recorded in the southern Appalachians, but is missing in the northern part of the orogen. During the Paleozoic, the accretion of peri-Gondwanan terranes was partitioned, with Carolinia and Suwanee confined to the southern Appalachians and Ganderia, Avalonia, and Meguma limited to the northern Appalachians. Consequential to this partitioning, associated magmatism and some attendant tectonism is asymmetrically distributed between the two segments of the orogen. The terminal Appalachian collisional event, the Carboniferous Alleghanian orogeny, is distinctly different in the two segments of the orogen; there is an asymmetry with respect to the volume of magmatic rocks in the northern and southern Appalachians and their Carboniferous tectonic styles contrast sharply. There is a modern first-order topographic change in the foreland of the orogen; the southern foreland is characterized by a continuous elevated plateau, whereas north of the New York promontory, foreland topography is more varied.

All of these varied first-order changes occur in the vicinity of the New York promontory, suggesting that it represents an enduring, fundamental boundary in the orogen. The nature and duration of differences between the two segments of the Appalachians indicate that this boundary was not an extrinsic ephemeral feature, such as a plate triple junction or hot spot. Rather, we suggest that an intrinsic difference in the Laurentian lithospheric substrate present from the outset of the Appalachian cycle, as reflected by contrasts in the Mesoproterozoic basement in each segment, could be the root cause of these significant contrasts.

Social hour - 6:00 p.m. **Dinner - 7:00 p.m.** **Program - 8:00 p.m.**

Dinner costs **$25.00/person**, **students $5.00**; checks preferred. **Reservations should be emailed to Steve McGuire at;** smcguire@chesterengineers.com, please title the e-mail as "PGS Dinner Reservation" or call (412) 809-6723(cell), Reservations can also be made using PayPal at our website http://pittsburghgeologicalsociety.org and leave your name and number of reservations needed by **noon, Monday**, **September 17**.

Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Green Tree.

BIOGRAPHY
Dr. James Hibbard, Professor, Dept. of Marine, Earth, and Atmospheric Sciences, North Carolina State University
Raleigh, North Carolina

Jim Hibbard grew up at the juncture of the northern and southern Appalachians, in the Hudson Valley and Catskill Mountains of New York. He was introduced to the newly breaking concept of plate tectonics at Colgate University, where he received his BA in Geology (1973); he continued his studies and obtained a MS in Geology (1976) at Memorial University of Newfoundland. Jim spent one year as a research assistant to Dr. Hank Williams, helping to develop the first Tectonic Lithofacies map of the Appalachians. Subsequently, he spent seven years as project geologist of the Baie Verte area for the Geological Survey of Newfoundland and Labrador. He returned to academia for his PhD in Geological Sciences (1988) at Cornell University; there his studies focused on deformation paths of Miocene rocks of the Shimanto accretionary complex in southwest Japan. Jim has been at North Carolina State University since 1988, where he teaches structural geology, tectonics, and Appalachian geology. His research focuses on Appalachian tectonics; he was chief compiler of the new Lithotectonic Map of the Appalachian Orogen (2006) and he has undertaken projects along the length of the orogen.

GREETINGS FROM THE PRESIDENT

Welcome to the 2012 – 2013 season of the Pittsburgh Geological Society. Our thanks for the past successes go to: Patrick Burkhart, Vice- President; John F. O'Neil, Treasurer; and Bob Fedinetz, Maury Deul, and Barbara Hamel, Directors at Large. Our new officers are Kyle Frederick, Vice President, Steve McGuire, Treasurer, William Gould, Secretary; and William Adams, Ray Follador, Erica Love, Charlie Jones and Tamra Schiappa, Directors-at-Large.

On a national level, the 2012 – 2013 looks to be another great opportunity for PGS following the successful GSA Joint Northeastern Section and North-Central Section meeting in Pittsburgh, in 2011. PGS is on the cusp once again to highlight Pittsburgh and our society to the geological, educational, and public communities. This month, at the Eastern Section AAPG Meeting in Cleveland, the PGS and PAPG will be sharing an exhibit booth. Many board members will be in attendance giving presentations on their research and work. Next year, the AAPG Annual Convention is coming to Pittsburgh, in May. PGS board members and membership will be well represented. In fact, PGS is sponsoring several AAPG Field Trips.

Back home, PGS has been both a leader and a partner with many institutions contributing to the growth of geologic knowledge of western Pennsylvania. After an outstanding list of seminar speakers, the president, board members, membership, and corporate sponsors helped contribute to a wider public discourse on geology. The president organized several field trips in collaboration with Venture Outdoors, Nine Mile Run Watershed Association, The Neighborhood Academy, and the Shady Side Earth Science Middle School class, and spoke to more than 20 private organizations on Geology, the Marcellus Shale and Energy. In February, I organized a five-week class at the University of Pittsburgh Osher Institute (55 and older program) on "The Marcellus Shale Gas Play and More", PGS members Ray Follador, John Harper, Kris Carter, Tom Donohue, and Fred Baldassare, contributed with their talks. 67 adults attended – an all time high for a science based theme at Osher. At CALU (California University of Pennsylvania the student field workshop was organized by Kyle Frederick and Frank Benacquista. That too reached all time high student participation. Following a successful April Student night, the board voted to support funding for The Pittsburgh Regional Center for Science Teachers (PRCST) two - day workshop, "Natural Gas Extraction – Marcellus Shale: Impacts and Benefits" organized by Jane Konrad (PRCST) and John Harper. This workshop was held on July 11 – 12, 2012 at the Pennsylvania Geologic Survey facility on Washington's Landing, PGS members participating, including John Harper, Ray Follador, Kris Carter, Maury Deul, and Albert Kollar.

Albert D. Kollar
President
September, 2012

PRESIDENT'S CHALLENGE:

With the President's $500 contribution to the Galey Fund last year (a PGS Fund to support student participation in the society's activities; Student Dinner Subsidy, Student Night Awards, Student Tool Trade (CALU), the fund grew from the initial $1,655 (September, 2011) to $4,925 by June, 2012. Although Galey saw a significant growth for the year, we still had a deficit of $2,623 to cover all student costs of $7,550. This year, I have renewed my pledge for another $500 challenge toward a permanent endowment of the Galey Fund. We are looking for sponsors that may want to endow each of the student activities, Student Dinner Subsidy, Student Night Awards, and the Student Tool Trade at (CALU).

ORIGINS OF WESTERN PA PLACE NAMES

Ireland native Jeremiah Murry came to Pennsylvania in 1781 and settled in Franklin Township, Westmoreland County, where he built a cabin and grist mill and operated a store. In 1820, following the construction of the Northern Turnpike (now US 22), he purchased several hundred acres of land that he subdivided into lots and streets, thus establishing the town of Murrysville. Murrysville is home to the famous Haymaker well drilled

in 1878, which produced from the Upper Devonian Murrysville sand. In 1882, Joseph N. Pew and E. O. Emerson purchased the well, formed the Peoples Natural Gas Company, and piped the gas to Pittsburgh. This was the first natural gas service to a large city in the country.

DID YOU KNOW . . . ?

- There was a prominent globally extensive hyperthermal event at the Paleocene-Eocene boundary about 55 million years ago that is referred to as the Paleocene-Eocene Thermal Maximum (PETM); this has been characterized by rapid climatic and geochemical changes, and a major extinction of benthic organisms, probably as a result of dysoxic or anoxic conditions in the deep-sea.
- Isotopic records from soils and plant fossils indicate that the climate during the PETM was generally very humid, although it was initially preceded in some areas by aridity.
- As things stand today, declining oxygen concentrations and expansion of some of the oxygen minimum zones in the oceans could spell trouble if global warming continues unabated; it could lead to the kind of hypoxia that characterized the PETM, meaning that dissolved oxygen could be too low to support a wide variety of marine life.
- Volcanologists studying the extrusive rocks related to Yellowstone Park's big Huckleberry Ridge supervolcanic eruption about 2.1 million years ago now conclude that one of the three lava flows resulted from a separate eruption about 6000 years after the big event.
- The chemistry of the world's oceans has varied greatly throughout geologic time, from the iron-rich anoxic deep ocean conditions that probably prevailed throughout the Precambrian to the well-oxygenated conditions that prevail in the modern ocean.
- The bad news: Data from a recent NASA release indicate that the Earth is surrounded by about 4700 potentially hazardous asteroids, many of which are large enough to survive a fall through Earth's atmosphere and cause a lot of damage.
- The good news: Many of those potentially hazardous asteroids probably contain a wealth of mineable minerals, should any corporation or nation be willing to put together a near-Earth mineral exploratory program. Mine them prior to their causing our extinction?
- In 1907, Pittsburgh was the oil financial capital of the world.
- Dolomite formation by sulfate-reducing bacteria, where the bacteria are consuming lots of organic matter, has been observed as a significant biogeochemical process in water with hypersaline conditions.
- The Black Sea is the largest and most studied anoxic basin in the world today; in contrast, the Bahamas are the most studied region of carbonate deposition.
- Magma becomes brittle when brittle stresses accumulate more rapidly than can be mitigated by viscous deformation.
- Those Chinese paleontologists are at it again! They've found an Early Cretaceous relative of *Tyrannosaurus rex* that was completely covered in feathers, making it the largest feathered dinosaur known.
- If you think the summer of 2012 was warm, consider the last interglacial period, which lasted from about 130,000 to 116,000 years ago – mean annual temperatures across Europe and North America were probably about 5 to 10°F higher than they are today.
- The lycopods of the Pennsylvanian forests, such as *Lepidodendron* and *Sigillaria*, two common forms, were mostly large trees up to 135 feet tall and having trunks as much as six feet in diameter.
- Scientists have found an extruded sand body in the North Sea that measures about 2.4 cubic miles in volume, enough to bury the island of Manhattan to a depth of 525 feet. The sand body has been interpreted as water-saturated sand buried beneath the seafloor that was squeezed out at high velocity due to increased subsurface pressure from Pleistocene glaciation.
- Marine evaporite deposits formed during just about every geologic period since the Earth's ocean formed, yet these deposits make up less than one percent of the stratigraphic record.
- Blue Mountain in Pennsylvania, which runs from Maryland to the Delaware River, forms an almost unbroken boundary between the Ridge and Valley and Great Valley.

PGS Website of the Month

http://www.chemicool.com

If you have news items you would like included in the PGS newsletter, please send them to Bob Botterman at rbottgeo@aol.com. Special thanks to all who contributed newsletter items this season—especially to John Harper who writes the Western PA Place Name Column.

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Wednesday, September 17, 2012

The Pittsburgh Geological Society presents

Eight Years of Working and Roving on Mars

Dr. James W. Rice, Jr.
Co-Investigator: Mars Exploration Rover Missions NASA Goddard Space Flight Center, Planetary Geodynamics Laboratory

I knew from a very early age that I wanted to commit my life to the great adventure of exploring space. I have been interested and dreamed about exploring space ever since I was seven years old. I have never really wanted to do anything else with my life. I remember my father taking me out to watch meteor showers as a young boy. As I lay on the hood of his truck gazing up into the dark night watching meteors glowingly zip by overhead it dawned on me that space was a real place to go and explore. It wasn't some fantasy land that existed only in your dreams or storybooks but it was in fact somewhere we could go one day to explore all its glorious mysteries and I wanted to be part of it. Growing up I naturally built and launched countless model rockets, wrote letters to astronauts, looked through my telescope, and read as much as I could about space exploration. Two events that had a profound influence on my life were the Apollo Lunar landings and the later Viking robotic landing on Mars. It was a very thrilling time to be alive because I was able to go look up at the Moon in our backyard and know that Americans were up there walking and working. I wanted to be part of the next big step in exploration and that would be landing astronauts on Mars. From this point onward Mars has always been the focus of my career.

I received my BS degree in Geology from the University of Alabama. The reason I wanted to study geology was because I ultimately wanted to learn about the geology of other planets, especially Mars. I was the only person in the Geology Department who was interested in Astrogeology, most were interested in Petroleum Geology and working for Oil Companies. I then went to Northeast Louisiana University for my MS degree and did detailed geologic mapping of a region that contained evidence of enormous floods and possibly lakes on Mars. I was also accepted for an Astrogeology Internship position at the United States Geological Survey in Flagstaff, Arizona during this time. This job enabled me to meet and work with some of the leading Astrogeologists in the world. It was a very rewarding experience. I obtained my Ph.D. at Arizona State University where I specialized in the study of the geomorphology of the channels and landforms on Mars. While working on my Ph.D. I was invited by NASA to go on a 6 month long joint expedition to Antarctica with the Russians. This expedition allowed me to go and explore the last frontier on the surface of the Earth. It was one of the most exciting times of my life and perhaps as close as I will ever get to going to Mars. Going to Antarctica is a lot like going to another planet in terms of logistics, risks, isolation, remoteness, and exploration and discovery. The biggest adventure while down there involved SCUBA diving under the ice covered lakes. The ice cover was 12 to 15 feet thick and it required several days of very hard work for us to make our dive holes by hand. I was studying these and other lakes as analogs to lakes that may have

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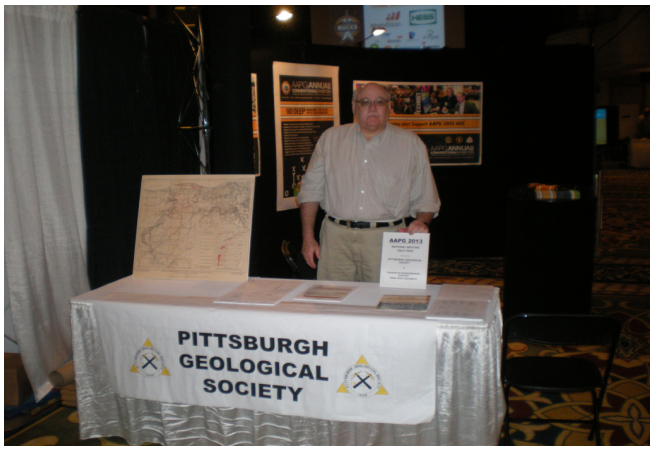
existed on Mars in the past. I still continue to go on science expeditions to Mars-like places around the world like Iceland and Devon Island in the High Arctic. I also worked on Mars Polar Lander, which unfortunately crashed on Mars back in December 1999. Exploration and danger go hand in hand. I presently work at the Mars Space Flight Facility located at Arizona State University. I am working on the THEMIS camera onboard Mars Odyssey. I target the cameras, take pictures of Mars and then analyze the images for future landing sites and geologic studies to help us better understand this planet. I was also accepted as a Science Team Member on both Mars Exploration Rovers. I feel that I have one of the best jobs in the world. Currently, I am working at the NASA Goddard Space Flight Center in Greenbelt, MD as an astrogeologist and continuing to study Mars. It continues to be an honor and privilege going to work every day. Dreams do come true!

PGS AT AAPG-ES IN CLEVELAND



Frank Benacquista, Robert Burger, and Albert Kollar volunteered to promote the 2013 AAPG National Meeting in Pittsburgh, at the ES AAPG Meeting in Cleveland, Ohio, September 23 – 25, 2012. PGS promoted the sponsorship of three AAPG Field Trips. 1. Rifts, Diabase, and the Topographic "Fishhook", and Miltary Geology of the Battle of Gettysburg – July 1 – 3, 1863, co-sponsored with the AAPG Division of Environmental Geology; 2. Hills, Dales and Oil Trails; and 3. Facies of the Great American Carbonate Bank in the Central Appalachians.

STUDENT FIELD WORKSHOP

There will not be a Student Field workshop this fall. The Spring 2013 PGS Student Field Workshop has yet to be scheduled but students should be on the look out for when they can sign up Last Spring it filled up early and many wishful attendees were shut out. Watch the Newsletter for the opportunity to signup by contacting Frank Benacquista at: *fbenacquista@kuresources.com*

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The city of Sharon, in Mercer County, was settled in 1795. The first families that settled there found a flat plain along the Shenango River between two hills. Local legend has it that the area reminded folks of the description of the Plain of Sharon in the Bible, and thus the name stuck. Sharon was once a large industrial center due to its extensive coal deposits, but today deindustrialization has reduced the industrial aspect and increased the service aspect of the city. Sharon lends its name to the Sharon sandstone, the oldest Pennsylvanian-aged rock in western Pennsylvania. Where it occurs, it sits directly on Mississippian-aged rocks at the Mississippian-Pennsylvanian unconformity..

DID YOU KNOW . . . ?

- A recent USGS open-file report estimates that the Upper Ordovician Utica and Point Pleasant formations in New York, Ohio, Pennsylvania, and West Virginia have the potential to produce about 940 million barrels of oil, 38,212 billion cubic feet of natural gas, and 208 million barrels of natural gas liquids.

- The results of some of the data the MESSENGER spacecraft studying the planet Mercury has sent back is stunning. Between 3.5 and 4 billion years ago, the planet experienced volcanic gashes up to 15 miles long that gushed lava, carving valleys and forming plains covering an area as big as 60 percent of the US.

- The Morrison Formation of the Rocky Mountains area consists of gray, green, and purplemusstones, fine sandstones, and limestone.

- The Fort Peck Dam in Montana is the second-tallest dam in the US at 250 feet high. It is dwarfed by Hoover Dam in Nevada, which is 726 feet high.

- Rising temperatures at the end of the Wisconsinan glacial epoch led to a decline in certain grasses and willows, encouraged growth of conifers and birches (which are toxic), and helped development of peatlands, all of which was detrimental to sustaining wooly mammoth populations. Add to that the expansion of human hunting territory and you have a good case for mammoth extinction.

- Epidote, the structurally complex mineral having both single silicate tetrahedrons (SiO4) and double silicate tetrahedrons (Si2O7), as well as parallel chains of AlO6 and AlO4(OH)2, can produce some magnificent crystal specimens with a unique green color that is often described as "pistachio".

- It has been suggested that the physiological effects of hyperoxia (high oxygen content in the atmosphere) could help stimulate animal locomotor functions and energy. As such, flight in late Paleozoic insects and in mid-Mesozoic dinosaurs may have developed as a result of hyperoxia, especially if coupled with a hyperdense atmosphere that would have helped augment aerodynamics.

- The Valles Marineris trough zone on Mars is 2,500 miles long, the longest known canyon system in the solar system.

- The largest volcanic eruption in Europe over the last 200,000 years was the Campanian Ignimbrite super-eruption about 39,000 years ago near where Naples, Italy now lies.

- Simulations using data from ash-fall deposits and weather patterns suggest that the Campanian Ignimbrite ash blew as much as 25 miles high and lasted up to four days. The simulations suggest the volcano ejected as much as 25 cubic miles of ash and rock that would have spread over about 1.5 million square miles.

- According to the World Meteorological Organization, an El Niño event was supposed to develop in the Pacific Ocean in September and October, affecting global climate. El Niño typically is associated with significant changes in temperatures and rainfall worldwide, including northern hemisphere winters that tend to be mild over western Canada and parts of the US and wet in the southern states.

- The Caribbean island of Barbados has exposures of basement rocks along some of its beaches, consisting of turbidites scraped off the subducted South American plate and deposited in submarine canyons.

- Hundreds of Jurassic dinosaur footprints have been found in a geological park in Yanqing County outside of Beijing, China, the first ever found near the capital. Footprints have been identified as belonging to thyreophoras, theropods, ornithopods, and probably sauropods as well.

- A combination of sedimentation patterns, pedogenesis, and bioturbation ultimately determines the characteristics of paleosols that are preserved in the stratigraphic record.

- Geoengineering is the process of purposely altering earth systems, such as climate, in order to mitigate potential problems, such as global warming, that would affect life on the planet.

- Some aspects of geoengineering being considered include injecting aerosols into the atmosphere to block incoming radiation, and scattering iron in the oceans to increase algal blooms that would remove CO2 from the atmosphere.

- When the Krakatoa volcano erupted in 1883, the entire island was blown apart and the resulting tsunami killed tens of thousands of people on surrounding islands. The ash thrown into the atmosphere affected the weather around the world – places as far away as Britain and the US experienced bizarre red sunsets as a result.

- In 2010, the last year for which there is any published data, Pennsylvania produced 18,000 metric tons of dimension stone valued at $3,770,000.

PGS Website of the Month

http://www. mbendi.com/indy/ming/gold/af/p0005.htm

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Officer Contacts: If you wish to contact a current PGS Officer, please call or email Albert Kollar, President, at 412.622.5513 / KollarA@CarnegieMNH.org; Kyle Fredrick, Vice President, at 724 938-4463 / fredrick@calu.edu; Steve McGuire, Treasurer, at 412 809-6723 (cell),/ smcguire@chesterengineers.com; William Gould, Secretary, at 412 389-2859 / wwgould@wwgeosciences.com.

Memberships: For information about memberships, please write PGS Membership Chair, PO Box 58172, Pittsburgh PA 15209, call John Harper at (412) 442-4230, or e-mail jharper@state.pa.us. Membership information may also be found at our website: www.pittsburghgeologicalsociety.org.

Programs: If you would like to make a presentation at a PGS meeting, please contact Kyle Frederick, Program Chair at 724. 938-4463 or email at fredrick@calu.edu.

PGS Website: To contact the Webmaster, Mary McGuire, with questions or suggestions, please either email marykmcguire@comcast.net or use the site's "Contact Us" link at www.pittsburghgeologicalsociety.org.

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Vol. LXV, No. 3 | Robert Botterman, Editor | November, 2012

Wednesday, November 28, 2012

The Pittsburgh Geological Society presents

Fossil Rainforests of Patagonian Fire Lakes and Their Australasian Legacy

Peter Wilf, Ph.D.
Associate Professor of Geosciences
537 Deike Building
Pennsylvania State University
University Park, PA 16802-2714 USA

Dr. Peter Wilf has collected extensively from prolific fossil beds derived from 50-million year-old volcanic rainforest lakes in Patagonia, Argentina. His discoveries include hundreds of plant species, many whose closest living relatives are rainforest trees found not in South America but in Australasia, including the mountain rainforests of New Guinea and nearby tropical islands that are now more than 8,000 miles from the fossil sites. Dr. Wilf will discuss these findings and what they can tell us about ancient flora and climate change.

Dr. Peter Wilf, a paleobotanist, is Associate Professor of Geosciences at Pennsylvania State University and Distinguished Lecturer for the Paleontological Society. His major research interest is the evolution of life and ecosystems on land and responses to massive environmental change, including the end-Cretaceous (dinosaur) extinction 66 million years ago and the global warming episodes that followed within 10 million years. Dr. Wilf has pursued this interest chiefly through collecting and studying fossil plants all over the world, especially in the Rocky Mountain West and in Patagonia, Argentina. Recently, he has been chasing the living relatives of fossil Patagonian plants in tropical Australia and Borneo.

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Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Green Tree.

VOLUNTEERS NEEDED

The organizers of the Student Career Seminar, which will be held on Monday afternoon, May 20, 2013, from 4-5:30 PM at the AAPG annual meeting (ACE), are looking for volunteers to serve as mentors for the seminar. This workshop is designed to assist students and recent graduates in their employment search endeavors within the petroleum and environmental industries by better understanding the activities of day-to-day life in these industries, and also offers specific job search strategies and tips for finding that perfect job.

There will be a brief introduction to the table discussion leaders, who are industry managers and technical professionals, followed by a series of 30-minute facilitated roundtables where students are encouraged to ask questions of the discussion leaders.

The discussion leaders will rotate amongst the tables, maximizing interaction between industry professionals and students. Students may also choose to sign up for a resumé review with an industry recruiter during this workshop. The resumé review offers practical guidelines for resumé development and interviewing tips.

Students attend, and mentors rotate among tables to talk to each group of students for a few minutes (think "speed dating" for geologists). It's a great opportunity to answer questions students have about careers and tell a little bit about how you got to where you are. If you are interested or have questions about what's involved, please contact Lee Avary, avarygeo@gmail.com

A description of the 2012 event can be found at:
http://www.aapg.org/longbeach2012/StudentActivities.cfm

ORIGINS OF WESTERN PA PLACE NAMES

Samuel Rice settled in Bloomfield Township, Crawford County, around 1831, when the area was essentially unbroken forest. He erected a cabin and a saw mill on Oil Creek and was soon joined by other hearty souls; in 1834, he opened a store to cater to the growing population. This settlement gradually grew into the village of Riceville (circa 1839), named for its first citizen, and established a post office in 1848. It was finally incorporated as a borough in 1859. I.C. White named the Upper Devonian Riceville Formation in 1881 as 80 feet of very fossiliferous, drab or bluish-gray, sandy shales and shaly sandstones with no black or red layers. This is ironic in that the Riceville is best known in the subsurface for having numerous layers of dark brownish-red or purplish-red shales and siltstones, leading drillers to call it “red rock”. The Riceville Formation lies directly on the prolific Venango oil sands in northwestern Pennsylvania.

PETROLEUM HISTORY FIELD TRIP

Albert Kollar led a geology petroleum history field trip through the Oil Creek Valley on Thursday, October 11, 2012, for the University of Pittsburgh Osher Lifelong Learning Program. 38 participants visited the McClintock No. 1 oil well, the Drake Well Museum, and historic Pithole City site. Kollar also presented a lunchtime lecture on The Future of Energy in America.

STUDENT FIELD WORKSHOP

There will not be a Student Field workshop this fall. The Spring 2013 PGS Student Field Workshop has yet to be scheduled but students should be on the look out for when they can sign up. Last Spring it filled up early and many wishful attendees were shut out. Watch the Newsletter for the opportunity to signup by contacting Frank Benacquista at: *fbenacquista@kuresources.com*

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AAPG ENERGY MINERALS DIVISION:

We want to mention that Andrea Reynolds, one of PGS’s two AAPG Delegates, and AAPG’s Energy and Minerals Division (EMD) President, authored an article in the AAPG Explorer, November 2012, p. 70, *Bridging Public, Politics and Production.* Find the article at: http://www.aapg.org/explorer/2012/11nov/index.cfm

DID YOU KNOW . . . ?

- Prokaryotes, those microbes that have no nucleus, mitochondria, or other membrane-bound organelles, conserve energy from the environment by synthesizing Adenosine-5'-triphosphate (ATP), which transports chemical energy within cells.
- Kilauea, the volcano on Hawaii, has been erupting almost continuously since 1983!
- The Central Asian Orogenic Belt is the largest accretionary orogen in the world, occupying an area of about 13.7 million square miles. It has an accretionary history that ranges from the late Proterozoic to the early Mesozoic.
- Magmatic fluid composition, crystallization, and separation, as well as the deposition of any ores, is generally controlled by the oxidation state of the magma.
- Continental shelf canyons on carbonate slopes are substantially different from those receiving clastic input from rivers because the only sediment sources are either from the immediate area (carbonate platform lime generation) or from material brought in by shelf currents or winds.
- If you think an increase in atmospheric CO2 only affects global warming, think again. Studies of fossil plants and their environment during the global CO2 high at the Triassic-Jurassic boundary shows that plants responded physiologically to reduce transpiration, which increased runoff and erosion of the land.
- Chinese paleontologists have unearthed the oldest known flying fish, and the first to be found in Asia. The Triassic fossil fish from Guizhou Province in southwest China belongs to the same group of animals as today's flying fishes, which includes about 50 species.
- It has long been thought that deep-sea vent and seep faunas were "pre-adapted" to such harsh life by having descended from shallow-water vent and seep faunas that moved offshore. But new research suggests that the vast majority of deep-water vent/seep adaptations probably occurred below the photic zone.
- Earths' "twin sister", Venus, rotates so slowly that it orbits the sun faster than it can make one whole rotation on its axis (243 Earth days for one rotation, 224 Earth days for one revolution), so one Venusian day is longer than a Venusian year.
- Global oil production has grown by 163% since 1965, an average annual growth rate of 2.1 percent. In fact, 2011 set a new global production record at 83.6 million barrels per day.
- Time Magazine's Fareed Zakaria recently reported that America's buildings, if considered as a separate entity from the country as a whole, would be the planet's third largest user of energy. America and China would rank 1 and 2, respectively.
- The two phases of calcium carbonate, calcite and aragonite, are found in a wide range of geologic environments, but the conditions under which aragonite forms are still puzzling. Aragonite is denser than calcite, so it should be a higher-pressure form of CaCO3, but in fact aragonite transforms to calcite at higher pressures.
- The global climate during the early Cenozoic was warm and humid, but became cooler and drier in the higher latitudes starting around 45 million years ago (middle Eocene).
- Hundreds of Jurassic dinosaur footprints have been found in a geological park in Yanqing County outside of Beijing, China, the first ever found near the capital. Footprints have been identified as belonging to thyreophoras, theropods, ornithopods, and probably sauropods as well.
- When we think of weathering, we typically tend to think of rock outcrops deteriorating and forming debris slopes; but weathering is critical to life, providing soil to grow in and mineral nutrients essential to ecosystems.
- Weathering also helps regulate the long-term carbon cycle and global climate systems
- Tyuyamunite (Ca(UO2)2V2O8•5-8(H2O)) is a secondary mineral occurring in the oxidized zones of uranium-vanadium deposits. The tongue-twisting mineral was named for Tyuya-Muyun in the Fergana Valley of Kyrgyzstan.
- The ice ages that occurred during "snowball Earth" times in the Neoproterozoic were followed by hothouse conditions, marking these as the most extreme climate changes in geologic history.

PGS Website of the Month

http://www.planetaryresources.com/mission

If you have news items you would like included in the PGS newsletter, please send them to Bob Botterman at rbottgeo@aol.com. Special thanks to all who contributed newsletter items this season—especially to John Harper who writes the Western PA Place Name Column.

News items: To submit a news item for the PGS Newsletter, please contact Robert Botterman at (412) 780-3094, mail at 139 Brookmeade Dr., Pittsburgh, PA 15237, or email at rbottgeo@aol.com. Be sure to also send an email address and phone number where you may be contacted.

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Memberships: For information about memberships, please write PGS Membership Chair, PO Box 58172, Pittsburgh PA 15209, call John Harper at (412) 442-4230, or e-mail jharper@state.pa.us. Membership information may also be found at our website: www.pittsburghgeologicalsociety.org.

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PGS Website: To contact the Webmaster, Mary McGuire, with questions or suggestions, please either email marykmcguire@comcast.net or use the site's "Contact Us" link at www.pittsburghgeologicalsociety.org.

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PGS Newsletter

http://www.pittsburghgeologicalsociety.org/

Vol. LXV, No. 4 Robert Botterman, Editor December, 2012

Wednesday, December 19, 2012

The Pittsburgh Geological Society presents

Seaside Geology of Alaska at 20 Knots (Roughly 23 MPH)

Dan Billman, Billman Consulting, Geophysicist

In June of 2011, seven oil and natural gas couples took a tour of the Pacific Northwest and the Inside Passage of Alaska … these are their stories.

The group of us flew to Seattle, Washington and most of us went straight to Mount Rainer for a quick tour of the scenery and geology. After returning to Seattle, we went by Amtrak to Vancouver, British Columbia (a very interesting trip in itself).

Once on the cruise ship (Ours was the Celebrity Century with a top cruising speed of 21.5 knots) we had 7 days to enjoy the inside passage of Alaska with stops at Icy Strait Point, Juneau and Ketchikan. There were numerous shore excursions available at these ports and typically we broke up into smaller groups to take excursions that suited us. The Billman's took a whale watch tour off Adolphus Point and a jet boat tour of Tracy Arm Fjord and the South Sawyer Glacier. We'll be seeing a lot of both of these tours as we were able to get a bit closer to both the geology and the wildlife.

Social hour - 6:00 p.m. **Dinner - 7:00 p.m.** **Program - 8:00 p.m.**

Dinner costs **$25.00/person**, **students $5.00**; checks preferred. **Reservations should be emailed to Steve McGuire at;** smcguire@chesterengineers.com, please title the e-mail as "PGS Dinner Reservation" or call (412) 809-6723(cell), Reservations can also be made using PayPal at our website http://pittsburghgeologicalsociety.org and leave your name and number of reservations needed by **noon, Monday**, **December 17**.

Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Green Tree.

VOLUNTEERS NEEDED

The organizers of the Student Career Seminar, which will be held on Monday afternoon, May 20, 2013, from 4-5:30 PM at the AAPG annual meeting (ACE) here in Pittsburgh, are looking for volunteers to serve as mentors for the seminar. This workshop is designed to assist students and recent graduates in their employment search endeavors within the petroleum and environmental industries by better understanding the activities of day-to-day life in these industries, and also offers specific job search strategies and tips for finding that perfect job.

There will be a brief introduction to the table discussion leaders, who are industry managers and technical professionals, followed by a series of 30-minute facilitated roundtables where students are encouraged to ask questions of the discussion leaders.

The discussion leaders will rotate among the tables, maximizing interaction between industry professionals and students. Students may also choose to sign up for a resumé review with an industry recruiter during this workshop. The resumé review offers practical guidelines for resumé development and interviewing tips.

Students attend and mentors rotate among tables to talk to each group of students for a few minutes (think "speed dating" for geologists). It's a great opportunity to answer questions students have about careers and tell a little bit about how you got to where you are. If you are interested or have questions about what's involved, please contact Lee Avary, avarygeo@gmail.com

A description of the 2012 event can be found at:
http://www.aapg.org/longbeach2012/StudentActivities.cfm

ORIGINS OF WESTERN PA PLACE NAMES

The first settlers in the area now called Bolivar (pronounced BALL-i-ver), Westmoreland County, on the east side of Chestnut Ridge, arrived circa 1829 to work for the Pennsylvania Mainline Canal, which ran down the south side of the Conemaugh River from Johnstown to the Allegheny River. The community eventually was named for Simon Bolivar, the famous South American soldier and statesman (despite the different pronunciation). Because coal and an excellent fire clay were found locally, several brickyards begun in the area produced building bricks and refractory bricks for coke ovens. One of the Bolivar brickyards operating in the mid-1800s was the largest brickyard in the North America, with a daily capacity of 100,000 bricks. As the community grew and prospered, it became known as "Brick Town", and finally gained borough status in 1863. The brick business and the town declined during the Great Depression, but to this day Bolivar lends its name to one of the finest brick-making fire clays in the eastern US.

GEOLOGY FIELD TRIPS

Albert Kollar led a geology hike with 15 participants through Riverview Park on November 18th in collaboration with Venture Outdoors. Riverview Park is knows for it's landslide originating in the Birmingham and Clarksburg Red Beds.

On Saturday, December 1, Kollar led a geology hike in lower Frick Park along Nine Mile Run in association with the Nine Mile Watershed Association. We visited fossil sites in the Glenshaw and Casselman formations, the slag dump now a housing development known as Summerset, as well as landslide zones along Commercial Avenue near the Irish Center. 35 participated.

STUDENT FIELD WORKSHOP

The Spring 2013 PGS Student Field Workshop has been tentatively scheduled for April 6, 2013 at California University of Pennsylvania (CALU). Student registration fees have been increased this year to $20.00 to help defer costs and to promote attendance. Students should be on the look out for when they can sign up. Last spring it filled up early and many wishful attendees were shut out. Watch the PGS Newsletter for the opportunity to sign up, or simply contact Frank Benacquista at: fbenacquista@kuresources.com.

PRESIDENT'S CHALLENGE

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DID YOU KNOW . . . ?

- The forearc is the area located between a subduction zone and its associated volcanic arc.
- New continental crust is often accreted in forearc environments, and this accretion often includes small bits of oceanic crust.
- Antarctica is the best place on Earth to find meteorites because: 1) being dark-colored rock, meteorites stand out against the background of light-colored ice; 2) falling onto ice produces less damage than fall onto rock; 3) ice flowing outwards toward a rock or mountain shears upwards, bringing any

enclosed meteorites to the surface where they tend to concentrate; and 4) even where the ice is trapped against a mountain, ice melt from solar hear exposes many meteorites.

- The 2009 L'Aquila earthquake in central Italy resulted in six scientists and government officials being convicted of manslaughter for downplaying the likelihood of a major earthquake only six days before the earthquake hit.
- The main shock of the L'Aquila earthquake rated a 5.8 on the Richter scale and a 6.3 on the moment magnitude scale. The earthquake resulted in the deaths of 297 people.
- Acid mine drainage from abandoned coal mines has impacted more than 7,500 miles of streams in Pennsylvania and West Virginia, with a cost for reclamation of the streams in western Pennsylvania alone estimated to be over $15 billion.
- It has been estimated that several hundred million tons of dust from Africa are blown westward over the Atlantic to the Caribbean, Central America, and South America annually.
- Warm air associated with summer storms has been known to lift dust as high as 15,000 feet above the African deserts, before it is then blown out across the Atlantic.
- An amateur fossil hunter found a 95-million year old jawbone of a new flying reptile near Dallas that has been named Aetodactylus halli. *The animal h*ad a relatively slender jaw filled with thin, needlelike teeth for catching fish from the shallow sea that once covered Texas.
- Astronomers have found evidence for a dying Sun-like star that briefly came back to life after casting its gassy shells into space. They think that this might be the fate our own Solar System in a few billion years, but personally, I don't intend to be around to witness it!
- British researchers state that the benefits of replacing coal with shale gas for electrical generation in the US is overstated because the mined coal that is unused in this country is simply being exported for power generation in Europe and Asia.
- A few meteorites found so far on Earth contain pallasites, gem-quality, olive-green crystals embedded in an iron-nickel matrix.
- A team of researchers from France and Denmark suggest that the lack neodymium-142 in the 3.4-billion-year-old rocks found in southwest Greenland supports the hypothesis that the Earth consisted of a gradually cooling ocean of molten magma between 100 and 200 million years after its formation,.
- Land is disappearing from river deltas at alarming rates, which is worrisome because deltas are ecologically rich and productive, as well as home to about 10 percent of the world's population.
- Emissions of CO2 from domestic energy production in the US have decreased by an average of 1.4 percent annually since 2005
- An infamous 45-million-year-old gap in the fossil record of insects was closed in August with the discovery of a nearly complete new genus from the Devonian of Belgium.
- Supposedly, the Permo-Triassic extinction event was caused by major fluctuations in the carbon content, overacidification, oxygen deficiency, and sea levels in the Permian oceans.
- Some researchers think that the reason plants and animals had a hard time recovering from the Permo-Triassic extinction event was because of global warming. Those species that survived the extinction supposedly didn't recover for 5 million years as a result.
- Chrysoberyl (BeAl2O4) is an orthorhombic mineral with a hardness of 8.5 that typically occurs in granite pegmatites associated with high-grade mica schists or reaction zones in ultramafic rocks. The gem quality stone is often called Alexandrite.
- If oceanic crust is young and relatively hot and buoyant, small slivers can be thrust up onto land when ocean basins close.
- A team of researchers from the US, Canada, and South Africa has found that human ancestors were making stone-tipped weapons 500,000 years ago in South Africa, 200,000 years earlier than previous estimates.
- While the actual explosiveness of supervolcano eruptions varies, the volume of magma extruded is enough to radically alter the landscape and severely impact global climate for years, and has a cataclysmic effect on life.

PGS Website of the Month

http://www.energyfromshale.org

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Vol. LXV, No. 6 | Robert Botterman, Editor | February, 2013

Wednesday, February 20, 2013

The Pittsburgh Geological Society presents

A SEISMIC REFRACTION STUDY OF THE COCOS PLATE OFFSHORE NICARAGUA AND COSTA RICA

Harman Van Avendonk, NSF Distinguished Lecturer for the Geoprisms Program,
University of Texas at Austin

The Cocos plate experiences extensional faulting as it bends into the Middle American Trench (MAT) west of Nicaragua, which may lead to hydration of the subducting mantle. To estimate the along-strike variations of volatile input from the Cocos plate into the subduction zone, we gathered marine seismic refraction data with the R/V Marcus Langseth along a 396-km-long trench-parallel transect offshore Nicaragua and Costa Rica. Our inversion of crustal and mantle seismic phases shows two notable features in the deep structure of the Cocos plate: 1) Normal oceanic crust of 6 km thickness from the East Pacific Rise (EPR) lies offshore Nicaragua, but offshore central Costa Rica we find oceanic crust from the northern flank of the Cocos-Nazca (CN) spreading center with more complex seismic velocity structure and a thickness of 10 km. We attribute the unusual seismic structure offshore Costa Rica to the mid-plate volcanism in the vicinity of the Galápagos hotspot. 2) A decrease in Cocos plate mantle seismic velocities from ~7.9 km/s offshore Nicoya Peninsula to ~6.9 km/s offshore central Nicaragua correlates well with the northward increase in the degree of crustal faulting outboard of the MAT. The negative seismic velocity anomaly reaches a depth of ~12 km beneath the Moho offshore Nicaragua, which suggests that larger amounts of water are stored deep in the subducting mantle lithosphere than previously thought. If most of the mantle low-velocity zone can be interpreted as serpentinization, the amount of water stored in the Cocos plate offshore central Nicaragua may be about 2.5 times larger than offshore Nicoya Peninsula. Hydration of oceanic lithosphere at deep-sea trenches may be the most important mechanism for the transfer of aqueous fluids to volcanic arcs and the deeper mantle.

BONUS LECTURE Dr. Van Avendonk will be following up his technical talk on Wednesday with a "public lecture" at the Carnegie Science Center on Thursday February 21, 2013 at 6:00 pm, as part of their Café Scientifique series. The talk is entitled, "The Life Cycles of the Margins of our Continents." Visit http://www.carnegiesciencecenter.org/programs/adult-programs-cafe-sci/ to register.

The discovery of the drift of the Earth's continents in the 1960s was one of the major milestones in the history of geosciences. In the following decades it became clear that supercontinents of the past formed by the collision and suturing of tectonic plates. In addition, it appears that these supercontinents later broke into fragments along rift zones that lie very close to the ancient suture zones. This phenomenon is called the Wilson cycle, and it must have reconfigured our continents over many 100s of million years. This cyclical nature has allowed geologists to compare offshore geological observations with rock outcrops in mountain belts, where ancient continental margins can still be seen.

Social hour - 6:00 p.m. **Dinner - 7:00 p.m.** **Program - 8:00 p.m.**

Dinner costs **$25.00/person**, **students $5.00**; checks preferred. **Reservations should be emailed to Steve McGuire at;** smcguire@chesterengineers.com, please title the e-mail as "PGS Dinner Reservation" or call (412) 809-6723(cell), Reservations can also be made using PayPal at our website http://pittsburghgeologicalsociety.org and leave your name and number of reservations needed by **noon, Monday**, **February 18.**

Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Green Tree.

KODY DWIRE MEMORIAL SCHOLARSHIP

CalU senior and PGS student member Kody Dwire was killed in a car accident in August 2012, at the age of 22. A bowling fundraiser and raffle to raise money for his memorial scholarship fund benefitting a CalU geology student from Somerset County, will be held on February 24th from 3 to 5 pm at the Brunswick Bowl on Route 51, north of Interstate 70. The 2 hour event will include a 50/50 cash raffle for the first person drawn that gets a strike and Kody's parents have donated a brand new bowling ball that Kody had won to be raffled off at the event. Tickets for the 2 hour event include a shoe rental and will be available at the February PGS meeting for $20 for non-students and $15 for students. Donations will also be accepted at the meeting c/o the CalU Foundation. Donations will be tax deductible.

If you need more information please contact Dr. Kyle Fredrick, Associate Professor, Dept. of Earth Sciences, California University of PA at Kyle.Fredrick@calu.edu

ORIGINS OF WESTERN PA PLACE NAMES

In 1778, Pennsylvania purchased 315 square miles in the vicinity of Lake Erie, including 45 miles of coastline, from the Iroquois. This land included what are now Erie County and its township of North East, so named because it is the most northeastern of the original 16 townships in the county. North East Township was settled in 1794, the first lakeshore township to achieve that. Over the years, a village grew up within the township that was originally named Burgettstown. That name was changed to Gibsonville in 1819, then to North East in 1834. North East Township lends its name to the (obviously misspelled) Northeast Shale, an approximately 400-feet thick series of shales and interbedded siltstones in the Upper Devonian of northwestern Pennsylvania and western New York.

STUDENT FIELD WORKSHOP

The Spring 2013 PGS Student Field Workshop has been tentatively scheduled for April 6, 2013, at the University of California – Pennsylvania. Student registration fees have been increased this year to $20.00 to help defer costs and to promote attendance. Students should be on the look out for when they can sign up, last spring it filled up early and many wishful attendees were shut out. Watch the Newsletter for the opportunity to signup by contacting Frank Benacquista at: fbenacquista@kuresources.com

11th ANNUAL STUDENT NIGHT

Students this is an opportunity for you to compete in student presentations sponsored by the Pittsburgh Geological Society, the Association of Engineering Geologists, and the American Society of Civil Engineers-Geotechnical Division at the 11th Annual Student Night on April 17 at Foster's Restaurant, #10 Foster Plaza, Greentree. If you have been doing undergraduate or graduate research in any geologically or geotechnically related field, you have the opportunity to show off your work to members of the three societies, and receive some benefits as well.

Abstracts (250 words or less) of research findings should be emailed to Kyle Fredrick, fredrick@calu.edu by March 6, 2013 for consideration.

Each society will select one student paper (graduate or undergraduate) for oral presentation. Additional abstracts may be accepted for poster presentations. All presenters will receive certificates of recognition and appreciation, as well as a complimentary dinner. The three oral presenters will each receive awards of $100, while poster presenters will receive $50. Students: please consider disseminating your research at this auspicious professional venue. Professors: please pass this information on to your students who are doing research.

CALL FOR NOMINEES

The Society is calling on the membership for interested candidates for next years Officer and Director-at-Large positions.

There are 3 Director-at-Large positions that need to be filled. These positions are for a term of 2 years and require regular attendance at the Board meetings held 1 hour prior to the Social hour of each monthly Society meeting. The position requires that you become involved at some level in the monthly operations of the Society by aiding the Officers and Committees in various ongoing projects.

If you are an active member of the Society and have an interest in being a candidate, or know of a member that you think would be a good candidate, please contact Ray Follador, Nominations and Elections Committee Chair, ASAP at geodawg@comcast.net or (724) 744-0399. A list of all candidates will be announced at the April meeting with the election to be held at the May meeting.

GO DEEP: MAKING THE PLAY WITH GEOTECHNOLOGY

Join AAPG in Pittsburgh, Pennsylvania for the AAPG Annual Convention & Exhibition (ACE) 19–22 May 2013. ACE is a world-class event, regularly attracting an average of 6,900 global attendees from 78 countries over the last five years. The breadth and depth of the technical program is international in scope and appeals to multiple geosciences disciplines. With more than 900 oral and poster presentations based on 11 themes you're sure to find just what you need to feel inspired and ready to take on any challenge!

Round out your trip with a number of pre- and post-convention activities. Our short courses cover everything from ethics to unconventionals. A few of our short courses include:

- Need a guide to shale plays? Try Basic Tools for Shale Exploration on Saturday, 18 May. You'll start with defining a shale play and end up with a brief overview of a few existing shale plays in North America. You will also review the type of existing data one needs to evaluate when moving into a new play area. AAPG members pay $695, nonmembers $895 and student members $115 (limited). Only 50 spaces available, price

increases by $100 after 19 April. Register early to guarantee your spot.

- If you are an oil and gas exploration geologist working in black shales and other units in the northern Appalachian Basin or are interested in the tectonics of the northern Appalachian then Faults in the Northern Appalachian Basin and Their Effects on Black Shale is for you. This course will take place on Sunday, 19 May. AAPG Members pay $695, nonmembers $895 and student members $115 (limited). Only 50 spaces available, price increases by $100 after 19 April. Register early to guarantee your spot.
- With horizontal drilling, geosteering has emerged as a powerful interpretation tool. The Three P's of Geosteering: Principles, Practice and Pitfalls is designed to introduce participants to geosteering principles, interpretation practices, and to recognize potential pitfalls. Professionals $200, Students $100. Only 50 spaces available so register early to get your spot.

For more information on these or other short courses, visit www.aapg.org/pittsburgh2013/ShortCourses.cfm.

Want to get out and explore? ACE has 15 field trips that range from white water rafting and camping to a 6 or 7 outcrop day trip. A few too choose from are:

- On Thursday, 16 May – Saturday, 18 May, The Appalachian Basin Structure: Rafting Trip through the Smoke Hole Canyon promises an opportunity to experience the Appalachians as they were prior to the 20th Century. It crosses and isolated and roadless portion of West Virginia where the only signs of civilization are abandoned cabins and farm houses. The canyon cuts obliquely through the core of the Cave Mountain anticline exposing several secondary folds in Silurian through Devonian strata. With only a 12 person limit on this trip, you must sign up early to get your spot. Professionals $525; Students $263 (limited).
- Visit the McClintock Well, the oldest, continuously operating oil well in the world (drilled in 1861). Hills, Dales and Oil Trails will not only take you there, but to the Drake Well Museum and grounds for a guided tour , lunch and more. This trip meets on Saturday, 18 May. Limit is 50 people. Professionals $200; Students $100 (limited).
- Key exposures that illustrate the inception, growth and destruction of the Cambrian-Ordovician Great American Carbonate Bank in the central Pennsylvania, the Great Valley of western Maryland, and the Frederick and Conestoga valleys of central Maryland and eastern Pennsylvania will be visited on Facies of the Great American Carbonate Bank in the Central Appalachians on Thursday, 23 May – Saturday, 25 May. Only 20 spots are available for this trip. Professionals $700; Students $350 (limited)

For more information on these or other field trips, visit www.aapg.org/pittsburgh2013/FieldTrips.cfm.

To help us better anticipate the number of attendees and avoid premature cancellation of field trips, please register well before 9 April 2013. Field trip cancellations due to low enrollment will be considered at this time. No refunds will be allowed on field trips after this date.

We look forward to seeing you in Pittsburgh. Remember to register for ACE before 25 March to save up to $300 on your registration. See more at www.aapg.com/ACE.

DID YOU KNOW . . . ?

- North Texas has seen a significant increase in small (<3.0) seismic events that are being blamed on hydraulic fracturing of fluid disposal wells related to the increased oil and gas well drilling in that area.
- The continent of Antarctica is considered to be a huge desert – annual precipitation averages only 8 inches along the coast, and much less inland.
- The idea that renewable energy from hybrid cars and windmills is more ecofriendly than fossil fuels needs to be readjusted – many deposits of the rare earth elements needed in the high-tech industry occur in rocks containing toxic and radioactive elements requiring proper disposal and mining clean-up.
- Singapore's annual precipitation is more than double the average global precipitation, but because of its lack of open space, it has trouble collecting and storing enough water for its large population (1.3 million).
- Hawaii's two big volcanoes, Kilauea and Mauna Loa, apparently share the same magma source in the mantle, which might explain why they don't seem to erupt at the same time.
- A 4.0-magnitude earthquake rattled southern Maine in October and was felt as far away as Connecticut, but caused no apparent damage or injuries. The U.S. Geological Survey said the epicenter was about 3 miles west of Hollis Center, Maine, and about 3 miles deep.
- In 2009, Noble Energy Company and Delek (US and Israeli oil companies, respectively) discovered a large natural gas reservoir 55 miles off the coast of Haifa that is estimated to hold about eight trillion cubic feet of gas.
- In 2010, another gas field was discovered offshore of Israel with a potential of 16 trillion cubic feet.

PGS Website of the Month

http://www.burgess-shale.bc.ca/image

If you have news items you would like included in the PGS newsletter, please send them to Bob Botterman at rbottgeo@aol.com. Special thanks to all who contributed newsletter items this season—especially to John Harper who writes the Western PA Place Name Column.

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Vol. LXV, No. 7 | Robert Botterman, Editor | March, 2013

Wednesday, March 20, 2013

The Pittsburgh Geological Society presents

GEOCHEMISTRY OF THE MARCELLUS SHALE

Dr. Tracy L Bank
University at Buffalo and National Energy Technology Lab, Pittsburgh PA

The Marcellus Shale, and other black, organic-rich shales, are known to be enriched in many redox-sensitive metals, including uranium, arsenic, antimony, molybdenum, zinc, and barium. Because the Marcellus Shale is even more organic-rich than average black shale, its metal concentrations are especially high. The fundamental characteristics of these metals and their fate when exposed to fluids of varying chemistry are the focal points of this research. A characterization of the geochemistry of the Marcellus Shale as well as experimental data from batch fluid-rock reactions will be presented.

11th ANNUAL STUDENT NIGHT

Students this is an opportunity for you to compete in student presentations sponsored by the Pittsburgh Geological Society, the Association of Engineering Geologists, and the American Society of Civil Engineers-Geotechnical Division at the 11th Annual Student Night on April 17 at Foster's Restaurant, #10 Foster Plaza, Greentree. If you have been doing undergraduate or graduate research in any geologically or geotechnically related field, you have the opportunity to show off your work to members of the three societies, and receive some benefits as well.

Abstracts (250 words or less) of research findings should be emailed to Kyle Fredrick, fredrick@calu.edu by March 6, 2013 for consideration.

Each society will select one student paper (graduate or undergraduate) for oral presentation. Additional abstracts may be accepted for poster presentations. All presenters will receive certificates of recognition and appreciation, as well as a complimentary dinner. The three oral presenters will each receive awards of $100, while poster presenters will receive $50. Students: please consider disseminating your research at this auspicious professional venue. Professors: Please pass this information on to your students who are doing research.

Social hour - 6:00 p.m. **Dinner - 7:00 p.m.** **Program - 8:00 p.m.**

Dinner costs **$25.00/person**, **students $5.00**; checks preferred. **Reservations should be emailed to Steve McGuire at;** smcguire@chesterengineers.com, please title the e-mail as "PGS Dinner Reservation" or call (412) 809-6723(cell), Reservations can also be made using PayPal at our website http://pittsburghgeologicalsociety.org and leave your name and number of reservations needed by **noon, Monday**, **March 18.**

Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Green Tree.

AAPG ANNUAL CONFERENCE AND EXHIBITION IN PITTSBURGH

The American Association of Petroleum Geologists (AAPG), the host organizations AAPG Eastern Section, the SEPM (Society for Sedimentary Geology) and co-supporting societies, the Pittsburgh Association of Petroleum Geologists and the Pittsburgh Geological Society are honored to bring the 2013 Annual Conference and Exhibition (ACE) to Pittsburgh, May 19 – 22, 2013. The local organizing committee invites everyone to attend, geologists and other oil and gas professionals, alike. This is the first time that AAPG has held the ACE meeting in the eastern United States since the early 1980's. The ACE meeting coming to Pittsburgh, now, is directly attributed to all the great advancements in geologic thinking, exploration, drilling and completion technology that have come out of the Appalachian Basin in exploration for the Marcellus and Utica Shales.

As a preeminent international geological organization, the American Association of Petroleum Geologists (AAPG) is uniquely positioned to attract an audience of geosciences professionals and associates. The technical program at ACE attracts industry leaders worldwide for its well-regarded oral and poster presentations. ACE is a world-class event, regularly attracting an average of 6,900 global attendees from 78 countries. The breadth and depth of the technical program is international in scope and appeals to multiple geosciences disciplines, exploration, development, production and environment. ACE also boasts the AAPG Global Gateway and International Pavilion, a place where exploration and investment professionals gather. It is a place to see, discuss and understand where our industry is headed, world-wide.

The meeting includes numerous geologic fieldtrips and short courses, from black shales to coal, from oil history to carbonate reservoirs. Also, included are numerous special forums, luncheons and networking events, as well as 900+ oral and poster presentations.

Registration is open and can be reached at https://www.aapg.org/pittsburgh2013/index.cfm. Also, there is plenty of time to sign up your organization to be a sponsor https://www.aapg.org/pittsburgh2013/ToSponsor.cfm or an exhibitor, https://www.aapg.org/pittsburgh2013/forExhibitors.cfm

The theme of the meeting is a familiar one to Pittsburgh … a sports theme. "Go Deep: Making the Play with Geotechnology". So, join the team and come to Pittsburgh for the largest petroleum geology and technology conference to come to the Appalachian Basin.

CARNEGIE DISCOVERS

Albert Kollar presented a talk to the Carnegie Discovers monthly meeting on Geology, Marcellus Shale, and Energy. He also led a geology and natural history field trip hike in collaboration with Venture Outdoors along the Peters Creek Valley, Jefferson Hills, PA.

YOU BE THE JUDGE!

The AAPG National Convention is coming to Pittsburgh May 19-22, 2013, bringing excellent oral presentations and poster sessions. Participate by volunteering to judge a morning or afternoon oral session or a poster session. When you register, check the questionnaire box under the category OTHER: "I want to be a judge," or contact Lindell Bridges [pureearth53@gmail.com or 724-383-4248] or Kathy Flaherty (EMD sessions) [kflaherty@abartaenergy.com or 412-968-1090]. Thank you!

ORIGINS OF WESTERN PA PLACE NAMES

Clarendon is a borough in Mead Township, Warren County. Originally called Pattonia after railroad builder William Patton, it was later named for Thomas Clarendon who, with his partner F. H. Rockwell, owned large tracts of land and timber in the area. Clarendon was chartered as a borough in 1882 and five years later was essentially destroyed in a fire. The citizens of the town moved and rebuilt about ¾ of a mile to the northeast in an area that had been called North Clarendon, leaving the remains of the original borough to be subsumed by the forest. Today, the borough has about 570 inhabitants. Clarendon lends its name, informally, to a prolific oil-producing sandstone interval in the Upper Devonian Bradford Group.

STUDENT FIELD WORKSHOP

The Spring 2013 PGS Student Field Workshop has been tentatively scheduled for April 6, 2013, at the University of California – Pennsylvania. Student registration fees have been increased this year to $20.00 to help defer costs and to promote attendance. Students should be on the look out for when they can sign up, last spring it filled up early and many wishful attendees were shut out. Watch the Newsletter for the opportunity to signup by contacting Frank Benacquista at: fbenacquista@kuresources.com

CALL FOR NOMINEES

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NORTH AMERICAN COALBED METHANE FORUM - SPRING SESSION AND SHORT COURSE - APRIL 23 -24, 2013

The North American Coalbed Methane Forum will hold a two day meeting on Tuesday April 23 and Wednesday April 24, 2013 at the Hilton Garden Inn at Southpointe near Canonsburg, PA. On Tuesday the Forum is offering a one day short course on permitting, site preparation and post frac production. On Wednesday, the Forum spring session will consist of presentations covering technical, regulatory, and legal aspects of coalbed methane development including reports on active CBM/CMM projects.. Attendees will be eligible for Professional Development Hours (PDH).

For information please contact:

Ihor Havryluk at 412-445-5803
(E-mail havryluk@zoominternet.net)
or
Dr. Kashi Aminian at 304-293-7682
(E-mail Khashayar.aminian@mail.wvu.edu)
and/or visit our website at www.nacbmforum.com

DID YOU KNOW . . . ?

- Michael Taylor, a vertebrate paleontologist at the University of Bristol in England, suggests that the reason the sauropod dinosaurs were capable of having such long necks is because their vertebrae were hollow (*Supersaurus* had a neck 50 feet long, over 2 times the length of *Diplodocus*).
- Based on the latest dating techniques, researchers at the Carnegie Institution in Washington DC have shown that the end-Triassic extinction event was timed precisely to the first of three pulses of megavolcanism associated with the opening of the Atlantic Ocean.
- Water is not cutting gullies on the Martian surface today. The Mars Reconnaissance Orbiter is seeing only dry ice (frozen CO_2), so changes to the surface of Mars are occurring when the CO_2 frost melts and everything from fine debris to boulders begins to move downhill.
- The Italian judge, who sentenced 7 scientists and engineers each to 6 years in prison last October because of the deadly 2009 earthquake in L'Aquila, said that the 7 had analysed the risk of a major quake in a "superficial, approximate and generic" way and that they were willing participants in a "media operation" to reassure the public.
- The Fall Line, a geological belt that runs from Maine to Alabama where the softer rocks and sediments of Atlantic and Gulf Coastal Plains override the hard metamorphic rocks of the Piedmont, is highly recognizable where waterfalls and rapids develop on rivers such as the Rappahannock and the Potomac where they cross the zone.
- Australia has become so hot that meteorologist have added new colors to their temperature map, which currently shows temperatures in orange tones, indicating temperatures between 104° and 118°F during the summer. Forecasts are predicting temperatures possibly exceeding 122°F, resulting in the addition of pink and purple to the map.
- Paleoanthropologists studying *Australopithecus* in Africa have confirmed that this hominid spent at least part of its time climbing trees.
- A new type of Martian meteorite weighing just over 11 ounces was discovered in the Moroccan desert in 2011; researchers say its texture and chemistry set it apart from all previous meteorites known to originate on Mars.
- According to a new study, ice bergs rode the Atlantic Ocean from west to east, from North America to Scotland, at the end of the Wisconsinan glaciation around 10,000 years ago.
- A team of scientists using InSAR data have suggested that a magnitude 5.1 earthquake that hit Spain in 2011 was probably triggered by the extraction of groundwater since 1960 that resulted in an approximately 820-foot drop in the regional groundwater level.
- Although you probably have enough water for all your uses, the same can't be said for lots of people. In places like Namibia, the supplies of freshwater are scarce enough that they are being supplemented with highly treated wastewater. Anyone for Monongahela River water?
- Illite, the dominant clay mineral in argillaceous rocks, is basically a group name for non-expanding, clay-sized, micaceous minerals that form by the weathering of feldspar, degradation of muscovite, or alteration of other clay minerals.
- Yale paleontologist Nicholas R. Longrich named a new Cretaceous lizard *Obamadon gracilis* after President Barack Obama because it had tall, straight teeth and, as Dr. Longrich said, "Mr. Obama has acted as a role model of good oral hygiene for the world."
- One type of volcanic behavior where small explosions of lava are caused by large bubbles of gas bursting as they rise through the volcanic conduit is called "strombolian" activity after the Italian volcano Stromboli.
- Stromboli has been almost continuously erupting, with small explosions from the summit, Sciara del Fuoco craters, and occasional lava flows, since 1934.
- The Gelasian is the earliest subdivision of the Pleistocene Epoch. It spans the time between 2.588 ± 0.005 and 1.806 ± 0.005 million years ago.

PGS Website of the Month

http://www.ncdc.noaa.gov/paleo/glaciation.html

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Vol. LXV, No. 8 | Robert Botterman, Editor | April, 2013

Wednesday, April 17, 2013

Joint meeting with the Pittsburgh Geological Society, the Association of Engineering Geologists, and the American Society of Civil Engineers present the

11th ANNUAL STUDENT NIGHT

Oral Presentation Sponsored by Pittsburgh Geological Society

Insights into the Appalachian Basin Middle Devonian Depositional System from U-Pb Zircon Geochronology of Volcanic Ashes in the Marcellus Shale and Onondaga Limestone

Chantelle Parrish, West Virginia University

Numerous thin volcanic ash layers are found within the upper Onondaga Limestone and lower Marcellus Shale of the Appalachian basin. These ashes were sourced from continental arc magmatism along the Acadian orogen during the Middle Devonian. They form key stratigraphic markers, allow for geochemical analysis of parent magma, and most importantly, provide radiometric dates used in determining depositional rates and chronostratigraphic relations.

Zircons were extracted from ashes found in 8 well cores and 2 outcrops in PA and WV. The ashes range in thickness from 0.5-14 cm and are recognized by their buff color, abundant white mica, and high U/Th ratios in spectral gamma ray logs. The U-Pb age of each ash layer was determined by analyzing 12-15 spots on individual zircon crystals at the USGS-Stanford SHRIMP-RG laboratory. The youngest concordant 206Pb/238U age populations were used to calculate average eruption ages also assumed to be coeval with the depositional age of each ash bed.

Conodont biostratigraphy for the Marcellus in the outcrop belt indicates a mid-upper Eifelian to lower Givetian age. However, our ash ages near the base of the Marcellus range from Late Emsian (396±2 Ma) to Late Eifelian (389±3 Ma), indicating that the basal Marcellus Shale was likely deposited diachronously. A trend is also apparent where the basal Marcellus is oldest in the western study area and becomes younger moving east, giving an age distribution which is inconsistent with the simplistic model of prograding Appalachian basin fill where the oldest sediments are expected closer to the eastern margin.

Social hour - 6:00 p.m. **Dinner - 7:00 p.m.** **Program - 8:00 p.m.**

Dinner costs **$25.00/person**, **students $5.00**; checks preferred. **Reservations should be emailed to Steve McGuire at;** smcguire@chesterengineers.com, please title the e-mail as "PGS Dinner Reservation" or call (412) 809-6723(cell), Reservations can also be made using PayPal at our website http://pittsburghgeologicalsociety.org and leave your name and number of reservations needed by **noon, Monday**, **March 18.**

Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Green Tree.

Oral Presentation Sponsored by the Association of Engineering Geologists

An Investigation of the Origin of Rock City and Cause of Piping Problems at Mountain Lake, Giles County, Virginia

Nidal Atallah, Department of Geology, Kent State University, Kent, OH 44240

Mountain Lake is one of two natural lakes in the state of Virginia and a major tourist attraction. The lake's unusual formation in the non-glaciated portion of the Appalachian Mountains has prompted geologists to attribute its origin to either a natural solution collapse basin or to landslide damming of a local stream. My research study focuses on mapping and analyzing the displacement
mechanics of large-size rock blocks present at the northern end of the lake in an area locally referred to as "Rock City". An additional objective is to investigate the piping of lake sediment associated with water loss into karstic bedrock, causing rapid water-level drops in recent years.
Mapping of the Rock City was conducted by taking GPS readings at the corners of the rock blocks and using ArcMap Software to generate maps. Investigations of the displacement mechanics of the rock blocks was done by taking measurements of the orientations of major discontinuity sets, including bedding, forming the rock-block boundaries. These data were compared with discontinuity data from the undisturbed outcrops using stereonet analysis. Sieve analysis, Atterberg limits, hydrometer analysis and permeability testing were used to evaluate lake sediment's susceptibility to piping.
Preliminary results show a high level of displacement of Rock City blocks with respect to undisturbed rock. Laboratory tests reveal that lake sediment consists of low plasticity silt and silty sand, which are known for their piping potential. The permeability tests demonstrate that that lake sediment pipes at hydraulic gradients exceeding 4.

Oral Presentation Sponsored by the American Society of Civil Engineers

The Influence of Geology and Mining Layouts on Water Discharges From Pennsylvania Underground Mine Pools

Blaise Bucha, Undergraduate Research Assistant, Civil and Environmental Engineering, Swanson School of Engineering, University of Pittsburgh

Acid mine drainage (AMD), has been an impact of legacy mining in southwest Pennsylvania for many decades. To combat AMD, mines are now required to leave a coal barrier between the mine workings and surface outcrops. Once the mine is closed, the workings fill with water. The barriers are intended to prevent the contaminated mine water from discharging to water sources on the surface.
However, even with barriers in place, discharges are still occurring. The analysis of three Somerset County mines, Grove No. 1, Solar No. 7, and Genesis No. 17, has shown that the geology of the area has a significant impact on whether or not discharges occur. In the first two mines, discharges were facilitated by mining induced seismicity and by full extraction mining near the barrier, respectively. On the other hand, the Genesis No. 17 barrier has proven successful to date at preventing discharges from the mine pool to surface waters.
Students led by Dr. Anthony Iannacchione at the University of Pittsburgh are working to develop more effective design criteria for coal mine barriers, taking into account geologic factors. Case studies are conducted using ArcGIS software to create 3-D models of mines and their geologic surroundings. These models, along with site visits, measurements, and interviews are used to determine factors associated with barrier performance. The final product of the analysis will allow coal companies and regulatory agencies to design functional barriers based on each mine's specific geology to prevent the occurrence of AMD discharges.

POSTER PRESENTATIONS:

Sponsored by Pittsburgh Geological Society

Geotechnical Investigation of the October 2011 Cedar City Landslide, Utah

Ashley S. Tizzano, Dept. of Geology, Kent State University, Kent, OH 44242;

On October 8, 2011, a massive landslide severely damaged SR 14 in Cedar Canyon, 8 miles from Cedar City. The landslide detached 1.5 million cubic yards of material from the south side of the canyon, displacing and covering a 1200-ft stretch of SR 14 under 100-ft thick debris. The stratigraphy of the canyon at the landslide site consists of the cliff-forming Tibbet Canyon Member of the Straight Cliffs Formation and the underlying, slope-forming, Tropic and Dakota Formations, all Cretaceous in age. The bedrock is covered by 75-100 feet of colluvial soil. The objectives of my study were to determine the type and causes of the Cedar Canyon landslide, the location of the failure plane, engineering properties of the colluvial soil and bedrock units involved in sliding, perform stability analysis, and develop suitable remedial measures. The field observations suggest the landslide initiated as a rotational movement near the scarp and transformed into a translational failure downslope, along the soil-bedrock contact. Lab tests show the contact between the Dakota bedrock and dry soil has a peak friction angle (φp) of 45°, peak cohesion (cp) of 4.33 psi, residual friction angle (φr) of 34.2°, and a residual cohesion (cr) of 0 psi. The contact between the Dakota bedrock and the soil at natural water content has φp of 34.5°, cp of 4.6 psi, φr of 34°, and cr of 1.8 psi. A rain and snow storm the prior day appears to have triggered the landslide. Pore pressure buildup in the colluvial slope of ~40° most likely caused the failure. This needs to be confirmed by stability analysis, currently being conducted.

Estimating the amount of total organic carbon in Devonian shales of the Appalachian Basin using wireline logs: a case study from eastern Kentucky

Anthony Nelson Vaiana, Indiana University of PA

Quantifying the amount of total organic carbon (TOC) in shale is a key step in evaluating its potential as an unconventional reservoir. Generally TOC is measured from core samples in a lab, which can be time consuming and costly. Estimating TOC using standard wireline logs could improve efficiency in characterizing shale reservoirs. Recent work has indicated that a log-based TOC estimate used in conventional plays can be adapted for use in unconventional plays. We use this method to estimate the variation in TOC through Upper Devonian shale reservoirs of eastern Kentucky using logs from over 100 wells. Future work will focus on comparing and calibrating our estimates to samples from wells in the study area, with the goal of testing the accuracy of log-based TOC predictions for the Upper Devonian rocks in the Appalachian Basin.

3D Interpretation of Mass Transport Deposits on the East Scotian Slope, Canada

Matt Toland, Indiana University of PA

Mass transport deposits (MTDs) are the sedimentary products of submarine mass wasting. MTDs can make up a volumetrically significant fraction of deepwater strata along continental margins and provide evidence for the recurrence of slope failures. Geohazard assessments along the Scotian slope (offshore Nova Scotia) have documented evidence for numerous MTDs using bathymetry, shallow cores and 2D seismic images yet few of these studies have characterized MTDs in 3D. Here we present results from a mapping project aimed at identifying and delineating late Cenozoic MTDs in a 3D seismic survey from the Scotian Slope. The seismic expression of several MTDs is compared and related to the mode of failure and/or transport. The largest MTDs were mapped in detail to estimate volumes of failed material. The findings presented here shed new light on the importance of MTDs along the Scotian margin and highlight key recognition criteria for MTDs in 3D seismic images.

Sponsored by American Society of Civil Engineers

Assessing Groundwater Contribution from AMD Treatment Ponds to Lake Arthur, Moraine State Park, PA

Matthew Miller, California University of PA

It is well-known that legacy coal mining has had significant impacts on the environment, particularly in the Appalachian coal regions. Legacy underground mining is pervasive, especially in the western part of Pennsylvania. Moraine State Park is an example of an area with demonstrated impacts to water quality from mine effluent. Lake Arthur, the centerpiece of the park, is a reservoir of Muddy Creek, a low-order tributary of the Ohio River. Established in 1970, the lake is a destination for recreational fishermen, boaters, and wildlife observers. In order to create the lake and protect local surface streams, many of the underground mines were sealed. However, over time several have failed and it is not uncommon to find the characteristic orange effluent in tributary streams and seeps. In 1996, a passive wetland treatment system was established and singled out as an educational example of impacts of coal mining in the area and the potential remediation efforts. The three-pond system was estimated to have a life span of twelve years. Over the past several years, the ponds have been monitored by students at California University of PA for educational and research purposes. It has become apparent during that time that the ponds have begun to fail and are no longer buffering Lake Arthur from mine effluent. Iron hydroxide precipitates have accumulated in the beds of the first two ponds, reducing their volume and residence times. Low pH water continues through the system to the third pond where it is not adequately treated before emptying into the lake. In addition to the obvious surface water discharges, it is hypothesized that groundwater contributions through the beds of the ponds is also negatively impacting the lake.

Topography alone would indicate that water from the ponds is emerging as a distributed discharge to the shores of the lake. Four piezometers have been placed in series to ascertain the impact of groundwater flow. Piezometric head data suggest a groundwater contribution from Pond 1 and possibly Pond 2, toward the lake. Additionally, temperature data suggest good communication between the groundwater system and the lake. With continued degradation of the ponds, it is likely that the impacts to Lake Arthur will increase over time and will negatively affect water quality.

Characterizing Slope Stability of Colluvial Soils in Ohio Using LiDAR Data

Matthew Waugh, Department of Geology, Kent State University, Kent, OH 44242

Slope instability in colluvial soils is a recurring problem along roadways throughout the state of Ohio. Colluvial soils develop from the weathering and deterioration of the underlying bedrock and tend to move downslope under gravity. Colluvial soils are typically derived from shales and claystones, which are prevalent in southern Ohio. The objective of this study is to investigate the differences in engineering properties of colluvial soils in Ohio, and to evaluate the use of airborne LiDAR in differentiating between the types of slope failure that occur in shale-derived versus claystone-derived colluvial soils. To accomplish this, twelve colluvial slopes, adjacent to highways and affected by slope movement, were sampled in central and southern Ohio, six in each of the two types of bedrock. The engineering properties determined to date include slake durability indices of bedrock units, and natural water content, grain size distribution, and Atterberg limits of the soil samples. Additional laboratory tests will include direct shear tests of rock-to-rock and rock-to-soil contacts and x-ray diffraction analysis on clay fractions of bedrock and soil samples. LiDAR data, obtained from OSIP, were used to generate digital elevation models for identifying different types of slope failures affecting shale-derived versus claystone-derived soils. Preliminary laboratory results indicate that claystones are less durable than shales, and generally, claystone-derived colluvial soils have higher plasticity index values than shale-derived soils. Initial evaluation of LiDAR effectiveness indicates that LiDAR imagery may be useful in differentiating between rotational slides common in claystone-derived soils and translational slides common in shale-derived soils. The next phase of research will focus on slope stability evaluation using direct shear tests results.

Sponsored by the Association of Engineering Geologists

Monitoring Water Quality for Historical and Emerging Impacts, Washington County, PA

Bryan Nicholson (presenting), Kyle C. Fredrick, Lisa Lohr, and Jennifer Dann

As pressure increases for energy resource exploration and extraction, water quality must be regarded with the utmost scrutiny, especially in areas of prior environmental stress. In southwestern Pennsylvania, a project is underway to acquire baseline water quality and monitor changes due to current impacts. Located near the California Borough, PA, data have been collected from local tributaries of the Monongahela River, the primary drinking water source for towns along its course, including Pittsburgh. Challenges to water quality exist due to historic coal mining, increased infrastructure development, and the potential impact of shale gas exploration and extraction within the local watersheds. It is impossible to attain a water quality background before historic coal mining began, but the chance remains to acquire background data before drilling activities mature in the area. The area of study, primarily within Washington County, is characterized by hill and valley topography with numerous streams and a humid continental climate. Land use varies from localized, sporadic development, especially along the Monongahela River, intermixed with agricultural development. Our primary target, Pike Run, responds quickly to precipitation, generating concern for the ability of the stream to dilute contaminants, especially during low-water level times between rain events. Conductivity, temperature, water level, and precipitation data in four different watersheds were collected. Our primary variable, conductivity, tells little by itself, but may indicate stresses to the health of a stream, especially when compared to flow (and precipitation). Conductivity values for Pike Run have been measured as high as 1200 µS/cm and average about 680 µS/cm during this 14 month study. Based on EPA standards we find the consistently high values troubling compared to other streams. When considering precipitation events, conductivity decreases indicating normal dilution. However, rapid rebound of values to above-acceptable levels is the norm.

Predicting the Permeability of Sandy Soils from Grain Size Distribution

Emine Mercan Onur, Department of Geology, Kent State University, Kent, OH 44242

Permeability is one of the most frequently used properties of sandy soils. It is well known that grain size distribution and relative density influence the permeability of sands but this influence has not been quantified. The objective of my research was investigate the quantitative relationships between permeability and grain size distribution parameters such as effective particle size (D10), coefficient of uniformity (Cu) and, coefficient of curvature (Cc), and to determine whether these relationships could be used for reliable estimates of permeability. I performed laboratory tests on six samples of sandy soils, ranging from well graded to poorly graded, to determine their grain size distributions, D10, Cu and, Cc values, as indicated by the grain size distribution plots, and maximum dry density and optimum water content values. Based on the compaction curves, I prepared five replicate samples of each soil at varying dry density values and determined their permeability values using the constant head permeability test. Data analysis shows that permeability decreases with increasing density, reaching its lowest value slightly dry of the optimum water content. The analysis also shows that D10, Cu and, Cc can be used for estimating permeability of sandy soils when lack

of equipment or time constraints may not allow conducting the permeability tests. Among the three grain size parameters Cc appears to show the correlation with permeability.

PGS Spring Field Trip

The PGS Spring Field Trip will be held on April 20, 3013 to Fayette and Greene Counties, PA. Henry Prellwitz will lead an excursion to examine the Jurassic-age Gates-Adah kimberlite dike near Masontown, Fayette County. Following that, John Harper lead an excursion to Carmichaels, Greene County, to discuss the Pleistocene-age Carmichaels Formation and Carmichaels cut-off meander of the ancient Pittsburgh River. While we are there, attendees will have the opportunity to collect plant fossils from the Upper Pennsylvanian Cassville shale along the banks of Muddy Creek. Cost for the field trip is $10 for students and $25 for professionals. Anyone interested in attending this field trip should email John Harper before April 17, 2013, the final deadline for signing up and paying for the trip. For further information on the trip, contact John Harper at jharper.pgs@gmail.com.

AAPG Annual Conference and Exhibition in Pittsburgh

The American Association of Petroleum Geologists (AAPG), the host organizations AAPG Eastern Section, the SEPM (Society for Sedimentary Geology) and co-supporting societies, the Pittsburgh Association of Petroleum Geologists and the Pittsburgh Geological Society are honored to bring the 2013 Annual Conference and Exhibition (ACE) to Pittsburgh, May 19 – 22, 2013. The local organizing committee invites everyone to attend, geologists and other oil and gas professionals, alike. This is the first time that AAPG has held the ACE meeting in the eastern United States since the early 1980's. The ACE meeting coming to Pittsburgh, now, is directly attributed to all the great advancements in geologic thinking, exploration, drilling and completion technology that have come out of the Appalachian Basin in exploration for the Marcellus and Utica Shales.

As a preeminent international geological organization, the American Association of Petroleum Geologists (AAPG) is uniquely positioned to attract an audience of geosciences professionals and associates. The technical program at ACE attracts industry leaders worldwide for its well-regarded oral and poster presentations. ACE is a world-class event, regularly attracting an average of 6,900 global attendees from 78 countries. The breadth and depth of the technical program is international in scope and appeals to multiple geosciences disciplines, exploration, development, production and environment. ACE also boasts the AAPG Global Gateway and International Pavilion, a place where exploration and investment professionals gather. It is a place to see, discuss and understand where our industry is headed, world-wide.

The meeting includes numerous geologic fieldtrips and short courses, from black shales to coal, from oil history to carbonate reservoirs. Also, included are numerous special forums, luncheons and networking events, as well as 900+ oral and poster presentations.

Registration is open and can be reached at https://www.aapg.org/pittsburgh2013/index.cfm. Also, there is plenty of time to sign up your organization to be a sponsor https://www.aapg.org/pittsburgh2013/ToSponsor.cfm or an exhibitor, https://www.aapg.org/pittsburgh2013/forExhibitors.cfm

The theme of the meeting is a familiar one to Pittsburgh … a sports theme. "Go Deep: Making the Play with Geotechnology". So, join the team and come to Pittsburgh for the largest petroleum geology and technology conference to come to the Appalachian Basin.

Attention Rockhounds – Specimens Free to a Good Home

Judy Neelan is offering an assortment of rock specimens that accumulated in her office over the years to anyone willing to carry them away.

Origins of Western PA Place Names

Girard Township in western Erie County was named for Stephen Girard, a Philadelphia millionaire and philanthropist who owned large amounts of land in the adjacent Conneaut Township. The township was created in 1832, and in 1846, a village within the township was incorporated as the Borough of Girard. I. C. White named the Girard Shale for a 225-foot thick succession of gray and bluish shales and rare, very thin sandstones or siltstones, exposed along Elk Creek near the borough

PGS Website of the Month

http://www.dcnr.state.pa.us/topogeo/publications/index.htm

If you have news items you would like included in the PGS newsletter, please send them to Bob Botterman at rbottgeo@aol.com. Special thanks to all who contributed newsletter items this season—especially to John Harper who writes the Western PA Place Name Column.

News items: To submit a news item for the PGS Newsletter, please contact Robert Botterman at (412) 780-3094, mail at 139 Brookmeade Dr., Pittsburgh, PA 15237, or email at rbottgeo@aol.com. Be sure to also send an email address and phone number where you may be contacted.

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Memberships: For information about memberships, please write PGS Membership Chair, PO Box 58172, Pittsburgh PA 15209, call John Harper at (412) 442-4230, or e-mail jharper@state.pa.us. Membership information may also be found at our website: www.pittsburghgeologicalsociety.org.

Programs: If you would like to make a presentation at a PGS meeting, please contact Kyle Frederick, Program Chair at 724. 938-4463 or email at fredrick@calu.edu.

PGS Website: To contact the Webmaster, Mary McGuire, with questions or suggestions, please either email marykmcguire@comcast.net or use the site's "Contact Us" link at www.pittsburghgeologicalsociety.org.

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PGS Newsletter

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Vol. LXV, No. 9 | Robert Botterman, Editor | May, 2013

Wednesday, May 15, 2013

The Pittsburgh Geological Society presents

"GREAT STEPS IN THE HISTORY OF LIFE: THE ORIGIN OF LIMBED VERTEBRATES"

Dr. Ted Daeschler, Associate Curator of Vertebrate Zoology,
Academy of Natural Sciences of Drexel University

Research on the origin of limbed vertebrates (tetrapods) has made great advances in recent decades as a result of paleontological discoveries including important new material from Late Devonian strata of north-central Pennsylvania and Ellesmere Island, Nunavut, Canada. The "fish-tetrapod" transition, as it is traditionally called, is no longer an evolutionary leap between free-swimming lobe-finned fish and lumbering early tetrapods. A series of fossil intermediates now illustrate the sequence of changes over million of years in the transformation from finned to limbed members of the tetrapod stem lineage. The interpretation of geological data and the range of fossils associated with the transition have also refined our understanding of the environmental settings that were the crucible of early tetrapod evolution. Dr Ted Daeschler will present on the recent Devonian discoveries, including Tiktaalik roseae, that are improving our understanding of these consequential evolutionary events.

Dr. Ted Daeschler has been at the Academy of Natural Sciences in Philadelphia since 1987. He studied geology at Franklin and Marshall College in Lancaster, Pennsylvania, and received a Masters in paleontology at the University of California at Berkeley in 1985. He was awarded his PhD at the University of Pennsylvania in 1998. Ted's research interests are centered on Late Devonian-age vertebrate fossils and the origin of limbed vertebrates. His responsibilities at the Academy of Natural Sciences focus primarily on research, collections building, and on public programs within the museum. He served as a scientific advisor for the renovation of the Academy's Dinosaur Hall, and a variety of other paleontological exhibits. Ted's work is a reflection of the rich history of vertebrate paleontology at the Academy of Natural Sciences, both in research and in public education.

Social hour - 6:00 p.m. **Dinner - 7:00 p.m.** **Program - 8:00 p.m.**

Dinner costs **$25.00/person**, **students $5.00**; checks preferred. **Reservations should be emailed to Steve McGuire at;** smcguire@chesterengineers.com, please title the e-mail as "PGS Dinner Reservation" or call (412) 809-6723(cell), Reservations can also be made using PayPal at our website http://pittsburghgeologicalsociety.org and leave your name and number of reservations needed by **noon, Monday**, **March 18.**

Meeting will be held at Foster's Restaurant, Foster Plaza Bldg 10, Green Tree.

AAPG ANNUAL CONFERENCE AND EXHIBITION IN PITTSBURGH

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ROCKS

A nice array of rocks will be available to interested persons at the next PGS meeting as I am seeking to reduce my rock inventory. If you are seeking to increase yours, they will be displayed on a table. No charge - first come, first served. Judy Neelan

YOU BE THE JUDGE!

The AAPG National Convention is coming to Pittsburgh May 19-22, 2013, bringing excellent oral presentations and poster sessions. Participate by volunteering to judge a morning or afternoon oral session or a poster session. When you register, check the questionnaire box under the category OTHER: "I want to be a judge," or contact Lindell Bridges [pureearth53@gmail.com or 724-383-4248] or Kathy Flaherty (EMD sessions) [kflaherty@abartaenergy.com or 412-968-1090]. Thank you!

CARNEGIE SCIENCE CENTER 74th PITTSBURGH REGIONAL SCIENCE AND ENGINEERING FAIR - APRIL 5, 2013 PGS AWARD WINNERS

The Pittsburgh Geologic Society is pleased to announce the winners of our awards at the Carnegie Science Center Pittsburgh Regional Science Fair held on April 5, 2012 at Heinz Field. The PGS has been a long time sponsor of awards at the Science Fair. The PGS sponsored two formal Science Fair awards. This year, one award winner was in the Intermediate (Junior High) Division. The second winner was in the Junior (6th Grade) High Division. This year there were also two additional projects to which we made special Honorable Mention awards. Both of these awards were made to Senior (High School) Division students. In evaluating student projects, the PGS judges considered the relevance of the project to the core scientific disciplines represented in the PGS, the manner in which the student followed the scientific method in the experimental design, conduct, evaluation of the results, and overall knowledge of the subject. The PGS judges were Steve McGuire and john Harper. This year there was a happy dilemma where all Divisions had multiple excellent projects that directly addressed geology, geochemistry, the geologic basis of environmental problems, and earth materials.

JUNIOR DIVISION

A Junior Division award was presented to Gabriel Batista who is in the 6th grade at the Falk Laboratory School which is affiliated with the School of Education at the University of Pittsburgh. The title of Gabriel's project was "Ring of Fire". Last year while visiting Indonesia, Gabriel became interested in the role of volcanoes and tectonic plate drift. Gabriel indicated that in the 1950's his grandfather was a geologist who was advancing the concept of continental drift. Gabriel first did research on the how volcanoes are formed in plate subduction zones. He then used geographic database information and computer programs from Rice University and the University of Tokyo to compute tectonic plate movement rates for different sets of plate intersections and for specific city and geographic locations. The judging team was particularly impressed with his knowledge of all the various concepts involved with his presentation.

INTERMEDIATE DIVISION

An Intermediate Division award was presented to Emma Burnett who is in the 7th grade at the Ellis School in Pittsburgh. The Ellis School serves girls from K through high school. The title of Emma's project was "Elements of Fluorescence". Emma became interested in this subject while

visiting a mine in North Carolina during which the regular lights were turned off and the minerals fluoresced. She wanted to know what minerals and elements were involved in the different fluorescent colors. The mine provided various samples for her use. The "Room of Requirements" at the Ellis School was fortunate enough to have a Scanning Electron Microscope (SEM) available for her use! Actually a professor at Duquesne Chemistry Department taught Emma how to use the Duquesne SEM and X-Ray Fluorescence equipment. Emma was able to document the minerals and elements associated with each emission color. The project was well documented and Emma exuded knowledge and excitement about her project.

SENIOR DIVISION HONORABLE MENTION AWARDS

A Senior High Division Honorable Mention award was given to Nathan Disantis who is in the 11^{h} grade at Freeport High School in Allegheny County. The title of his project was "Does Fly Ash Affect the Adhesive Strength of Motar?" Fly ash is a regulated waste and finding beneficial uses for fly ash is an important as a sustainable use. Nathan's experimental setup was simple but elegant. There were four treatments with 0%, 20%, 30%, and 40% fly ash / mortar proportions. There were 29 replicates for each treatment. For each test, two bricks were cemented together with the appropriate mortar composition. After curing, the bricks were hung vertically with a bucket to which sand was added until the mortar joint failed. The weight of the sand was the indicator of mortar joint strength. The statistical analysis indicated increasing joint strength with increasing fly ash proportion. Nathan's experimental documentation was particularly impressive.

A Senior High Division Honorable Mention award was given to Dylan Grindle who is in the 9th grade at Youghiogheny Senior High School in Herminie, Westmoreland County, PA. The title of his project was "Up-Structure vs Down-Structure". The purpose of the investigation was to determine whether Marcellus shale gas wells would have greater yields drilling horizontally uphill up-structure or downhill down structure toward or away from a ridge or mountain. Down-Structure drilling is most commonly used. In first judging the project in Dylan's absence, the judging team had difficulty in determining whether this was a literature review project or was there an actual experiment. The interview revealed all. Dylan indicated that he was interested in becoming and oil/gas engineer or geologist. We also learned that he had been interested in this subject for several years and that his family was in the drilling business. It turned out that the actual experiment was that he convinced his "Uncle Bruce" to drill two gas wells in Fayette County to test Dylan's hypothesis. The drilling took place during 2011-2012 with Dylan monitoring all aspects of the drilling program. Initial gas production records indicated that the Up-Structure well was had the greater gas yield. Dylan will be monitoring the test results in the future to compare the gas decline rates.

PGS ELECTION DURING MAY MEETING

The Society is calling on the membership to vote for the candidates for next year's Officers and Director-at-Large positions during the May Meeting. Can't attend the May meeting look for your ballot via e-mail or attached to this newsletter.

STUDENT ATTENDANCE BY SCHOOL – SEPTEMBER 2012- APRIL 2013

CALU	*SRU*	*PITT*	*IUP*
117	55	16	13
KENT	***WVU***	***CLARION***	***RMU***
12	6	2	2
AKRON	***ALLEGHENY***	***EDINBORO***	
1	1	1	

Time is running out for any school to catch CALU.

ORIGINS OF WESTERN PA PLACE NAMES

The Borough of Elizabeth in southern Allegheny County was founded by Samuel Mackay, Stephen Bayard, and Bayard's wife Elizabeth Mackay Bayard in 1787. They named the town Elizabeth Town in honor of Bayard's wife. Elizabeth supposedly is the site where the keelboat used for the historic Lewis and Clark Expedition was built in 1803, although the City of Pittsburgh disputes that. The town was incorporated as a borough in 1834. Elizabeth also lends its name to one of the deepest oil and gas producing sandstones of the Upper Devonian Venango Group. An outcrop of the Elizabeth sand can be seen near the structural crest of Laurel Hill anticline in the Youghiogheny River gorge near Ohiopyle in Fayette County, PA.

OSHER INSTITUTE GEOLOGY AND HISTORY

PGS President Albert Kollar taught a five week Geology and History class at the University of Pittsburgh's Osher Institute: How Geology Shaped Pittsburgh and World Events. Topics: Geology and Energy, Geology of the French and Indian War in Western Pennsylvania, Geology and the Lewis and Clark Expedition, and Geology and Landscape Paintings of John Kane.

PGS Website of the Month

http://www.pennminerals.com/museum.html

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Other PGS Positions		**AAPG Delegate:**	Dan Billman	**AAPG Delegate:**	Andrea Reynolds
Webmaster:	Mary McGuire	**Newsletter Editor:**	Robert Botterman	**Historian:**	Judy Neelan

Officer Contacts: If you wish to contact a current PGS Officer, please call or email Albert Kollar, President, at 412.622.5513 / KollarA@CarnegieMNH.org; Kyle Fredrick, Vice President, at 724 938-4463 / fredrick@calu.edu; Steve McGuire, Treasurer, at 412 809-6723 (cell),/ smcguire@chesterengineers.com; William Gould, Secretary, at 412 389-2859 / wwgould@wwgeosciences.com.

Memberships: For information about memberships, please write PGS Membership Chair, PO Box 58172, Pittsburgh PA 15209, call John Harper at (412) 442-4230, or e-mail jharper@state.pa.us. Membership information may also be found at our website: www.pittsburghgeologicalsociety.org.

Programs: If you would like to make a presentation at a PGS meeting, please contact Kyle Frederick, Program Chair at 724. 938-4463 or email at fredrick@calu.edu.

PGS Website: To contact the Webmaster, Mary McGuire, with questions or suggestions, please either email marykmcguire@comcast.net or use the site's "Contact Us" link at www.pittsburghgeologicalsociety.org.

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PITTSBURGH GEOLOGICAL SOCIETY
PO Box 58172
Pittsburgh PA 15209

Ballot

Pittsburgh Geological Society

Board of Directors Election

May 15, 2013

Note: Eligible voters include regular Members, Honorary Members, and Corporate Members (one vote each, by representative). Student members are ineligible to vote.

___ **President:** Albert Kollar

___ **Vice President:** Kyle Fredrick

___ **Secretary:** Judy Neelan

___ **Treasurer:** Steve McGuire

Director-at-Large Positions **(vote for 3)**

___ Robert Botterman P.G.
B. S. Geology 1980, Weber State, M. S. Geology 1990, University of Pittsburgh, Senior Hydrogeologist, Hull & Associates, Inc., PGS member since 1998.

___ Ryan Fandray
B. A. Environmental Studies 2000, University of Pittsburgh, M. S. Earth Science 2008, California University of Pennsylvania, Environmental Geologist, CONSOL Energy, PGS member since 1998.

___ William Gould
B. S. Geology 1980, California Institute of Technology, Ph. D. Geochemistry and Mineralogy 1989, Pennsylvania State University, Proprietor, WW Geosciences, member of Society since 2004.

___ Ken LaSota
BS, Meteorology 1977, Pennsylvania State University; MS, Geology 1982, Iowa State University; PhD, Geology 1988, University of Pittsburgh; MBA, Management 1992, Robert Morris University; MEd, Secondary Education 1999, Robert Morris University; MS, Instructional Leadership 2003, Robert Morris University. Associate Professor of Geology and Earth Sciences, Robert Morris University. Member of PGS since 2007.

___ Tamra Schiappa
B. S. Geology 1983, SUNY Plattsburgh, M. S. Earth Science 1993, Boise State University, Ph.D. Geology 1999, University of Idaho, Associate Professor, Department of Geography, Geology and the Environment, Slippery Rock University, PGS member since 2003.

All ballots must be cast at the May meeting. If you are not attending the meeting you can e-mail your completed ballot to jharper.pgs@gmail.com no later than Tuesday May 14th, 2013. If you are mailing your ballot by way of the U. S. mail please do so via the Society address (below) no later than Monday May 13, 2013.

Pittsburgh Geological Society
P. O. Box 58172,
Pittsburg, PA 15209